
Editorial

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Biographical note: Prof. Shyam Lal Rao, obtained B.Tech. Degree in Electronics and Communication Engineering from Bundelkhand Institute of Engineering & Technology, Jhansi (Uttar Pradesh), India in year 2001. He received M.Tech. Degrees in Electronics and Communication Engineering from National Institute of Technology, Kurukshetra (Haryana), India in year 2007. Ph.D. Degree from Birla Institute of Technology, Mesra Ranchi, India. Presently, he is working as Associate Professor in the department of Electronics and Communication Engineering, Moradabad Institute of Technology, Moradabad (Uttar Pradesh), India. He has more than 11.5 years of Teaching & Research experience. He has published more than 44 papers in international as well as national journals and conference proceedings. He is Member of IEEE, USA, life member of Indian Society of Technical Education (ISTE), New Delhi, India, Life member of International Association of Engineers (IAENG), Hong Kong and Life member of International Association of Computer Science and Information Technology (IACSIT), Singapore. His current areas of interest include Digital Image Processing, Digital Signal Processing, Computer Vision and Wireless Communication.

The third issue for 2013, Vol.6, No.3 of the International Journal of Signal and Imaging Systems Engineering (IJSISE) comprises a special issue on the topic of 'Digital Signal and Image Processing Applications'. It contains nine papers covering field of Digital Signal and Image Processing. I strongly believe that the selected research papers present various novel techniques for applications of Digital Signal and Image Processing.

The first paper entitled 'Improved Speaker Identification in Wireless Environment' by Anil Vuppala, Sreenivasa Rao K and Saswat Chakrabarti proposed a new method to determine the steady vowel region from the speech signal by using vowel onset points and epochs. Speaker identification studies are carried out using cellular, coded and microphone speech databases. Auto associative neural network models are explored for developing the speaker identification models. Speech coders considered in this work are GSM full rate (ETSI 06.10), CELP (FS-1016) and MELP (TI 2.4kbps). Significant improvement in the performance of speaker identification system is observed under coding by using features extracted from steady vowel region compared to entire speech.

The second paper entitled 'Pitch Based Cepstral Features for Gender Classification in Noisy Environments' by Mahesh Chandra and Pawan Kumar proposed pitch based cepstral features for a novel gender classification system. A database of 100 speakers, 59 males and 41 females has been used for performing the experiments. Training and testing was done using Gaussian Mixture Models (GMM) in clean and noisy environments. Noisy database was prepared by artificially adding speech noise,

F16 noise and operation room noise to clean database at -5dB, 0dB, 5dB, 10dB and 20dB SNR levels. Pitch from first sentence of every speaker was extracted using autocorrelation method. The extracted pitch was used as last element of the feature vector in pitch based features. The proposed, Pitch Based Linear Prediction Cepstral Coefficients (PLPCC) and Pitch Based Mel Frequency Cepstral Coefficients (PMFCC) has shown a maximum of 12.12% and 15.62% increment in performance over Linear Prediction Cepstral Coefficients (LPCC) and Mel Frequency Cepstral Coefficients (MFCC) respectively

The third paper entitled 'Analysis and Interpretation of Weld Flaws Using ANN' by Vijay Rathod, R.S. Anand and Alaknanda Ashok proposed a novel approach for the detection and classification of flaws in weld images is presented. Computer based weld image analysis is most significant method. The method has been applied for detecting and discriminating flaws in the weld that may corresponds false alarms or all possible nine types of weld defects (Slag Inclusion, Wormhole, Porosity, Incomplete penetration, Under cuts, Cracks, Lack of fusion, Weaving fault Slag line), after being successfully tested on more than 180 radiographic images obtained from EURECTEST, International scientific Association Brussels, Belgium and 24 radiographs of ship weld provided by Technic Control Co. (Poland) were used, obtained from Ioannis Valavanis Greece. The procedure to detect all the types of flaws and feature extraction is implemented by segmentation algorithm which can overcome computer complexity problem. And classification carried out by Counter propagation Neural Network. Features are important for

measuring parameters which leads in directional to understand image. We introduced 23 geometric features and 14 texture features. The Experimental results show that proposed method gives good performance of radiographic images.

The fourth paper entitled 'Modified FFT Features for Fingerprint Matching' by Sangita Bharkad, Manesh Kokare proposed a novel approach for fingerprint feature extraction by using modified Fast Fourier Transform (FFT) coefficients. Proposed method extracts the significant features from small portion of cropped fingerprint image using frequency-shifting property of discrete Fourier transform. The performance of proposed method is evaluated on standard fingerprint database available at Website of Bologna University. Results of proposed method are compared with discrete wavelet transform (DWT) and FFT based method. The proposed method improves genuine acceptance rate (GAR) from 77.14% to 96.73% over DWT and 88.26% to 96.73% over traditional FFT with very low computational complexity.

The fifth paper entitled 'Visual Cryptography based blind watermarking scheme for copyright protection by Sanjay Rawat and Balasubramanian Raman proposed a blind watermarking scheme based on visual cryptography. Two shares, namely master share and ownership share are constructed according to visual secret sharing scheme. A sub-image is extracted from the host image and master share is generated by combining the luminance features and edge features of this sub-image. Ownership share is constructed by using a binary secret image together with the master share. When the owner needs to be identified, it can stack these two shares to recover the secret image in order to validate the ownership. The proposed scheme can identify the rightful ownership without restoring the original image. The robustness of the proposed scheme is demonstrated through a series of attack simulations. Experimental results demonstrate that the proposed scheme is robust against various image processing operations, geometric attacks and JPEG Compression.

The sixth paper entitled 'Hindi Phoneme-Viseme Recognition from Continuous Speech' by A.N Mishra, Astik Biswas, Mahesh Chandra and S.N Sharan proposed Automatic Speech Recognition (ASR) system performs well under restricted conditions but the performance degrades under noisy environment. Audio-visual features play an important role in ASR systems in presence of noise. In this paper Hindi phoneme recognition system is designed using audio visual features. The DCT features of the lip region integrated with MFCC audio features are used to get better recognition performance under noisy environments. Colour Intensity, Hybrid Method and Pseudo Hue methods have been used for lip localization approach with Linear Discriminant analyzer (LDA) as a classifier. Recognition performance using Pseudo Hue method proved best among all the methods.

The seventh paper entitled 'Raga Identification of Carnatic Music Based on The Construction of Raga Model by Rajeswari Sridhar and Geetha T V proposed Raga

identification algorithm for Carnatic music. The process of Raga identification is performed by designing and constructing a novel static model called Raga model which is based on signal level features and musical features. The signal level features like spectral centroid, spectral flux, Melfrequency Cepstral coefficients and Carnatic interval Cepstral coefficients of every Raga is extracted and used in the model. The musical features that are used in the Raga model are derived from the Raga lakshana characteristics of Carnatic music. In this work the Raga lakshana characteristics namely Arohana, Avarohana, Graha, Amsa, Nyasa, Bahutva, Apanyasa, Sanyasa, Shadava are used for constructing the Raga model. The Raga identification process is a three-pronged approach which compares the signal level features, Arohana, Avarohana and music features of the input with the features available in the Raga model to determine the Raga of the input polyphonic music. The final Raga is chosen as the one that is determined in at least two steps of the three pronged process. A comparison of this algorithm using Raga model is performed with other algorithms that uses only signal level features, Arohana Avarohana, pitch class distributions. It was observed that the accuracy of the Raga model is more than 80%, which is higher than the other algorithms.

The eighth paper entitled 'Comparative Evaluation of Denoising Methods on Brain CT Images' by Harvendra Singh and M.L. Dewal discussed a comparative assessment of different denoising methods on brain CT images. This paper quantitatively compares total of six denoising methods namely wiener filter, median filter, anisotropic diffusion, wavelet based method, total variation (TV) and curvelet based method. The focus of this work is to compare these methods not only for suppression of noise but also for preservation of fine details and edges on brain CT images. The experimental results show that the curvelet based denoising method shows the best performance followed by wiener filter in terms of perceptual quality, noise suppression and edge preservation. However curvelet based denoising method generates some visual distortion in homogenous region of CT image. Total variation induces some staircase effect and loss of fine details. Wavelet based method yields better denoising particularly in homogenous region but does not gives better results in edgy regions and anisotropic diffusion shows blurring effect and thus edges and fine details may be lost.

The final paper entitled 'A Robust Approach for Background Subtraction with Shadow Removal for Moving Object Detection' by Anand Jalal proposed robust approach for background subtraction for numerous applications, including object tracking, surveillance, robot vision, object-based coding, image database and video teleconferencing. However, background subtraction approaches are very sensitive to dynamic scene changes, for example, noise due to a low quality camera, environmental phenomenon such as rain, camera jittering caused by an unstable camera support and variations in global illumination etc. This paper aims to investigate ways to exploit the characteristics of wavelet domain to improve moving object segmentation using

background subtraction for object tracking applications. In this paper, we also innovate to use the high frequency sub-band to neutralize the negative influences caused by cast shadow, without using any colour information. State-of-the-art performance of the proposed approach is illustrated by using both indoor and outdoor video sequences.

As a Guest Editor, I hope that the papers in this issue will stimulate further research in digital signal and image processing applications, because I believe that the best is yet to come. We hope that this issue, covering so many different aspects, will be of value for all readers. We thank all authors and reviewers for their invaluable work and we are sure that the increasing interest for this journal will attract many more important research papers in future. We think that the

quality has reached a certain level but we should not be satisfied with only this fact. Our efforts will focus on improving quality and especially indexing of this journal in the near future. To this end, we emphasize again that we need your help by submitting high-quality research papers citing works already published in this journal. Your high-quality comments and research reports are always more than welcome and very helpful to meet our targets. We express our appreciation to the Editor-in-Chief of International Journal of Signal and Imaging Systems Engineering Prof. Dimitrios A. Karras for his continuous support and help during the publication process. Last but not the least; Mrs Liz Harris deserves thanks for her excellent effort in bringing out this special issue.